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THE CASPIAN SEA: ITS RESOURCES AND THE DANGERS MENACING THEM

Victor Chanot

The Caspian Sea, reputedly the world's richest sea in numbers and variety of fish resources, is especially renowned as the center of the world's sturgeon caviar production.

Three types of sturgeon (including the white sturgeon), all utilized for their flesh, as well as caviar, salmon, herring, roach, carp, and bream, along with seals, constitute the principal commercial resources of the Caspian fisheries.

Although no precise figures on total catch are obtainable from Soviet sources, the Americans estimate that the annual production of the Caspian Sea is 600,000 tons of fish.

The Soviet government has aided the Caspian fishing industry in many ways. Ice breakers have been utilized for winter fishing. Airplanes and helicopters have reconnoitered fishing banks. Experiments on the possibilities of placing fish nets from the air have been undertaken with as yet unpublished results. Suction pumps have been used to unload fish.

About 70,000 persons are employed in fishing activities along 6,730 kilometers of Caspian coastline. Four stations under . . Institute of Fishing and Oceanography conduct extensive research on the shores of . . Caspian.

The Caspian Is Progressively Drying Up

The Caspian Sea is disappearing before man's very eyes: ports have been left high and dry, and islands previously located in the center of the sea have become peninsulas.

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In the last few years, evaporation has exposed over 100,000 hectares of dry sand. In 9 years the water level of the Caspian has fallen 2 meters. If this evaporation of the water is not quickly checked, within 12 years the water level will have dropped another 3 meters and there will no longer be a fishing industry in the Caspian Sea.

In more precise terms, since 1939 the Caspian Sea has lost 734,444 million cubic meters of water, a quantity great enough to turn the whole Iberian Peninsula into a lake one meter deep. Moreover, evaporation has been accelerating despite the great influx of water poured in by a river as important as the Volga. By the end of the 19th century the Caspian had dropped 100 meters below its highest water level. A drop of 23 meters in the water level during the last 70 years proves that evaporation is actually accelerating. At one time the Caspian was 80 meters deeper than the Black Sea; today, it is shallower by almost 30 meters.

The actual water level of the Caspian ranges from 14 meters in the north to 800 meters in the south. After the spring thaw, melting snow raises the over-all water level of the Caspian 2 meters.

The degree of salinity of the waters of the Caspian is another factor in the evaporation of the sea. The saline content of the water varies from 1.5 percent to 18 percent. Twenty kilometers from the mouth of the Volga the water is potable. In contrast, along the eastern coast, countless mounds of salt are lined up. Evaporation of one liter of water given 200 grams of salt here.

Despite the fact that rivers are pouring into the Caspian millions of tons of organic matter, and azotes, phosphorus, and other elements vital to fish diet, the food base of the sea has dropped sharply since 1937 because the degree of salinity of the water has exceeded the minimum level necessary for the maintenance of those froms of life utilized by the fish as food.

Confronted by this virtual catastrophe to its national economy, the Kremlin has posed two problems for its scientists and technicians:

1. To reconstitute the food base of the fish and to increase fish production despite the existing unfavorable conditions.

2. To check evaporation and to supplement the influx of rivers normally flowing into the Caspian by water brought in from additional sources.

The Fight Against the Impoverishment of the Caspian

First, Soviet scientists tried to introduce new varieties of marine life into the Caspian to replace the old, moribund varieties. For some time the scientists were intrigued by the similarity of fish families and of conditions of life in the Caspian and Azov seas. They selected the nereis as a potential food base for Caspian commercial fish varieties. The transfer of large numbers of nereis to the Caspian was carried out between 1939 and 1941. Altogether over 63,000 nereis were scattered at four points in the Caspian. In 1944 a nereis was found in the stomach of a sturgeon, and in 1948 the work of a special commission proved that the nereis has adapted itself to local conditions over many thousand square kilometers of the Caspian.

Soviet scientists also have attempted to discover a means of preserving and developing various species of sturgeon by means of artificial reproduction. Artificial insemination of sturgeon's eggs and the production of larvae are simple enough operations, but not too efective. Only a small fraction of these larvae attain their full development. In breeding, sturgeon fry must be kept in special nourishing basins in a simulated natural environment until the age of about 3 months

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when their development enables the sturgeon fry to resist the various tests of normal marine life. The corollary problem of furnishing the sturgeon fry living animals for food arose and was solved by the production of oligochetes and daphniae in large numbers. Finally, the scientists had to breed by hybridization new species of sturgeon capable of reproducing at constant rates in river mouths.

Although most Caspian research has been devoted to the sturgeon as the sea's primary resource, research work has also been done in regard to the greater reproduction rates of the semimigratory fish, the roach, bream, and carp. Natural basins had to be provided for the larvae and fry of these fish. These basins were located in river deltas and were made inaccessible to adult or predatory fish by the use of grates and sluices. The very process of reproduction is based upon the introduction of given numbers of propagators of the same or varied species whose mutual presence does not raise any obstacles to maximum reproduction. Under these conditions, the production of larvae has generally been five to six times greater than under normal natural conditions. Another advantage of the introduction of this type of breeding has been to enrich considerably the adjacent land areas during floods.

Some of the measures planned to eliminate the rapid diminution of Caspian fish reserves are possible of attainment; others are grandiose, if not actually chimerical. However, no Soviet or foreign source has as yet mentioned any concrete realization of the plan to introduce additional waters into the Caspian.

The Fight Against the Desiccation of the Caspian

One of the first measures which will probably be applied is the elimination of many thousands of hectares of reed-covered marshland which make up the delta of the Volga. These marshes, very poor in fish, nevertheless uselessly retain a large quantity of water which could be canalized into the sea. Furthermore, the reeds act as a veritable filter profitlessly retaining millions of tons of organic materials, azotes, and phosphorus which might have been feeding all the fish in the sea. Drainage of the marshes would also facilitate navigation of permitting ships of greater tonnage to negotiate the deeper sections of the Volga estuary. Finally, the drained marshes would constitute a very important agricultural resource.

At present, there exist three other great schemes aimed at bringing more, or at least as much, water into the Caspian as is now being lost by evaporation.

The first scheme envisages a junction between the Caspian and the Black Sea by means of a huge canal. However, this scheme is opposed by the Caspian fishermen who fear that the weaker Caspian fish would fall prey to the predatory Black Sea fish swarming through the canal into the Caspian.

The second scheme, already rejected, anticipated a diversion of the waters of several great Asiatic rivers into the Caspian. The opinion of the Minister of Agriculture who is responsible for the irrigation of millions of hectares of steppe and desert land prevailed over that of the Minister of Fish Industry, and the scheme was dropped.

The third solution which will probably be adopted in spite of the titanic nature of the work involved, provides for the diversion into the Caspian of rivers in northern European USSR which now empty into the Arctic.

Nothing has yet transpired to lead us to believe that the last scheme has gone beyond the research stage. Nevertheless, it would be wrong to dismiss this scheme as unrealizable. The results can be very important -- the climatic effect on the Caspian which is situated on the edge of vast desert regions; the significance of the Caspian as a source of foreign exchange obtained through the export of caviar; and the annual addition of millions of tons of very nourishing food to the diet of the Soviet people.

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